

**KIIT Deemed to be University**

**Online End Semester Examination (Spring End Semester Examination 2022)**

**Subject Name & Code:** **Mathematics-II & MA -1004**

**Applicable to Courses: 2nd semester B.Tech(Regular 2021AB & 2020,2019, 2018AB back)**

**Full Marks=50** **Time:2 Hours**

**SECTION-A (Answer All Questions. Each question carries 2 Marks)**

**Time:30 Minutes (7×2=14 Marks)**

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| **Question No** | **Question Type (MCQ/SAT)** | **Question** | **CO Mapping** | **Answer Key**  **(For MCQ Questions only)** |
| **Q.No:1** | **MCQ** | The final value of  for a given  is  (A)  (B)  (C)  (D) | CO3 | A |
|  | **MCQ** | The final value of  for a given  is  (A)  (B)  (C)  (D) |  | B |
|  | **MCQ** | The final value of  for a given  is  (A)  (B)  (C)  (D) |  | C |
|  | **MCQ** | The final value of  for a given  is  (A)  (B)  (C)  (D) |  | D |
| **Q.No:2** | **MCQ** | The incorrect equation among the following is  (A)  (B) The radius of convergence of is 1.  (C)  (D) | CO1, CO2, CO3 | C |
|  | **MCQ** | The incorrect equation among the following is  (A))] =  (B)  (C)  (D)Rodrigues’s formulae is [(].  where . |  | D |
|  | **MCQ** | The incorrect equation among the following is  (A)  (B)  (C)  (D) |  | C |
|  | **MCQ** | The incorrect equation among the following is  (A)  (B)  (C))] =  (D) |  | D |
| **Q. No:3** | **MCQ** | If is a periodic function of period with Fourier series then the Fourier coefficients are  (A) , , and  (B) , , and  (C) , , and  (D)None of these | CO4 | B |
|  | **MCQ** | If is a periodic function of period with Fourier series then the Fourier coefficients are  (A) , , and  (B) , , and  (C) , , and  (D) None of these |  | C |
|  | **MCQ** | If is a periodic function of period with Fourier series then the Fourier coefficients are  (A) , and ,  (B) , and ,  (C) , ,  (D) None of these |  | A |
|  | **MCQ** | If is a periodic function of period with Fourier series then the Fourier coefficients are  (A) , and ,  (B) , and ,  (C) , ,  (D) None of these |  | B |
| **Q. No:4** | **MCQ** | The value of directional derivative of at in the direction of  is  (A)  (B)  (C)  (D) | CO5 | C |
|  | **MCQ** | The value of directional derivative of at in the direction of is  (A)  (B)  (C)  (D) |  | A |
|  | **MCQ** | The value of directional derivative of at in the direction of  is  (A)  (B)  (C)  (D) |  | D |
|  | **MCQ** | The value of directional derivative of at in the direction of is  (A)  (b)  (C)  (D) None of these |  | A |
| **Q.No:5** | **MCQ** | If betta function is expressed in terms of gamma function, then ) is  (A)  (B)  (C)  (D) | CO2 | B |
|  | **MCQ** | If betta function is expressed in terms of gamma function, then is  (A)  (B)  (C)  (D) |  | C |
|  | **MCQ** | If betta function is expressed in terms of gamma function, then is  (A)  (B)  (C)  (D) |  | A |
|  | **MCQ** | If betta function is expressed in terms of gamma function, then is  (A)  (B)  (C)  (D) |  | D |
| **Q.No:6** | **MCQ** | For a vector function , the result of volume integral  becomes  (A) 5  (B) 0  (C) 1  (D) -3 | Co5 | B |
|  | **MCQ** | For a vector function , the result of volume integral becomes  (A) 0  (B) 6  (C) 1  (D) 4 |  | A |
|  | **MCQ** | For a vector function , the result of volume integral becomes  (A) 5  (B) 1  (C) 0  (D) -3 |  | C |
|  | **MCQ** | For a vector function , the result of volume integral becomes  (A) -5  (B) 1  (C) 7  (D) 0 |  | D |
| **Q.No:7** | **MCQ** | Divided difference of of the function is  (A)  (B)  (C)  (D) | CO6 | C |
|  | **MCQ** | In a trapezoidal rule to evaluate to the curve is approximated by  (A) straight line  (B) parabola  (C) exponential function  (D) None of these |  | A |
|  | **MCQ** | Integral evaluated by Trapezoidal rule taking 4 intervals is  (A) 0.001  (B) 0  (C) 0.0001  (D) 0.25 |  | B |
|  | **MCQ** | Integral evaluated by Trapezoidal rule taking 4 intervals is  (A)1.118  (B) 0  (C) 1.1176  (D) 1.1167 |  | D |

**SECTION-B(Answer Any Three Questions. Each Question carries 12 Marks)**

**Time: 1 Hour and 30 Minutes** **(3×12=36 Marks)**

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| --- | --- | --- |
| **Question No** | **Question** | **CO Mapping**  **(Each question should be from the same CO(s))** |
| **Q.No:8** | a. Show that the form under integral sign is exact in the plane and evaluate the integral  b. Show that | CO1. CO2, CO5 |
| a. Show that the form under integral sign is exact in the plane and evaluate the integral  b. Find one of the solutions of by Frobenius method |
| a. If , then evaluate , where is the arc of parabola from (0,0) to (1,2).  b. Solve the initial value problem by power series technique and also find the value of partial sum at  , , , |
| **Q.No:9** | a. Using Laplace transform solve the integral equation  b. Find the Fourier series expansion of the following function which is assumed to be periodic with period  Hence show that | CO3, CO4 |
| a. Find inverse Laplace transform of by convolution.  b. Find the Fourier series expansion of the following function which is assumed to be periodic with period |
| a. Solve the given initial value problem by means of Laplace transform  , ,where if and 0 if  b. Find the Fourier sine series of , 0 |
| **Q. No:10** | a. Solve the given initial value problem by means of Laplace transform  , , ,  b. Find the value of from using Simpson’s rule with . | CO3, CO6 |
| a. Solve the given initial value problem by means of Laplace transform  , , ,  b. Evaluate using Simpson’s rule with Hence determine the approximate value of . |
| a. Find Laplace transformations of the following functions  (i) (ii)  b. Evaluate using Simpson’s rule with . Hence determine the approximate value of . |
| **Q.No:11** | a. Using Green’s theorem in the plane evaluate counterclockwise, where is the boundary of the region defined by and .  b. Use Lagrange’s interpolation formulae to find a polynomial to the following data   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | -1 | 0 | 2 | 3 | |  | -8 | 3 | 1 | 12 |   Hence find . | CO5, CO6 |
| a. Change the order of integration in and hence evaluate the same.  b. Use Lagrange’s interpolation formulae to find a polynomial to the following data   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | 0 | 1 | 3 | 4 | |  | -12 | 0 | 6 | 12 |   Find the value of when . |
| a. Evaluate for the following data  , S: [, 0 ,  b. Using Newton’s divided difference formulae evaluate given that   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | |  | 4 | 5 | 7 | 10 | 11 | 13 | |  | 48 | 100 | 294 | 900 | 1210 | 2028 | |